

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

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PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

(PCT Rule 43bis.1)

Date of mailing
(day/month/year) 28 JULY 2004 (28.07.2004)

Applicant's or agent's file reference
2004OC-708KR

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/KR2004/000930

International filing date (day/month/year)
22 APRIL 2004 (22.04.2004)

Priority date(day/month/year)
23 APRIL 2003 (23.04.2003)

International Patent Classification (IPC) or both national classification and IPC

IPC7 F04B 39/06

Applicant

HALLA CLIMATE CONTROL CORPORATION et al

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/KR



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**WRITTEN OPINION OF THE
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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing
☐ table(s) related to the sequence listing

b. format of material

- ☐ in written format
☐ in computer readable form

c. time of filing/furnishing

- ☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	7	YES
	Claims		NO
Inventive step (IS)	Claims	7	YES
	Claims		NO
Industrial applicability (IA)	Claims	7	YES
	Claims		NO

2. Citations and explanations :

Reference is made to the following documents:

D1: EP 1116883 A2 (18 July 2001)

D2: JP 2001-200785 A (27 July 2001)

D3: JP 2001-193638 A (17 July 2001)

D4: JP 56-47687 A (30 April 1981)

1. Novelty and Industrial Applicability

Claim 7 meets the criteria for novelty and industrial applicability.

2. Inventive Step

The present invention relates to a motor driven compressor, wherein a part of the refrigerant which is to be flowed into a swash plate chamber passes through a motor chamber, so that the cooling efficiency of an electric motor is improved and at the same time the lubrication of an operation part located in the swash plate chamber can be smoothly performed.

The motor driven compressor claimed in claim 7 comprises: a motor part provided with an electric motor; a compressor part consisting of a cylinder block provided with a front housing, a rear housing, a swash plate chamber and a plurality of bores; a double-head piston which reciprocates in the inside of the bores; a supply means for separating the refrigerant flowed into the swash plate chamber and supplying the refrigerant to a motor chamber and an inlet chamber formed in the rear housing; and an intake guide hole for taking the refrigerant, which has cooled the motor chamber, into the bores of the cylinder block.

(Continued on Supplemental Sheet.)

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of :

Box V.

D1 and D2 relate to motor swash plate compressors, wherein a part of the refrigerant which has been taken in is directly guided into a motor chamber through a branch part and by using it as a refrigerant for cooling the motor, and then said refrigerant is sent to an intake chamber and mixed with the rest of the refrigerant taken in, and the mixed refrigerant is sent to a cylinder; and wherein a part of the refrigerant in an intermediate pressure chamber is flowed into the swash plate chamber through a path connected to the swash plate chamber.

Claim 7 is the same as D1 and D2 in the feature of cooling a motor chamber by using a low-temperature and low-pressure refrigerant which is not compressed. However, claim 7 is different from said documents D1 and D2 in the type of the piston, which is an application object: in claim 7, the piston is a double-head piston, whereas in D1 and D2 it is a single-head piston. Said difference results in differences in the detailed shape of the piston and in the intake and discharge paths of the refrigerant. In addition, in D1, the refrigerant in an intermediate pressure chamber in an increased pressure state is taken into the swash plate chamber, while in claim 7, the low-temperature and low-pressure refrigerant is directly taken into the swash plate chamber. Consequently, the invention of claim 7 has an improved effect for smoothly performing the lubrication of an operation part located in the swash plate chamber, compared to the invention of D1.

D3 relates to a multistage piston compressor, wherein the refrigerant is taken into a mid chamber in a first compressed state in a cylinder, a part of the increased-pressure refrigerant is sent to a motor through a swash plate chamber so as to cool a motor chamber.

Claim 7 is the same as D3 in the feature of cooling a motor chamber by using a refrigerant. However, claim 7 is different from D3 in the type of the piston, which is an application object, and in the state of the refrigerant used for cooling a motor chamber. Said differences result in the differences in the detailed shape of the compression member, the intake and discharge paths of the refrigerant. As for the cooling of the motor chamber, claim 7 has an effect for improving the cooling efficiency, compared to D3.

D4 relates to a compressor, wherein the refrigerant taken into a swash plate chamber through an intake is parted and sent to intake chambers formed at side covers of front and rear sides, and compressed and discharged.

Claim 7 is the same as D4 in the application object, which is a double-head type swash compressor. However, D4 does not include a motor chamber, and consequently does not disclose the subject matter of cooling a motor chamber, which is the technical problem to be solved by claim 7.

Therefore, claim 7 is considered to involve an inventive step in view of D1-D4.